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(54) Multiphase Antiperspirant Stick

(57) Stick preparations consisting of a composition with dimensional stability at 40°C, that can be spread on the skin, and that can be melted above 40°C, that consist of at least two separate solidified phases with different compositions that are arranged concentrically as core and shell, which contain a liquid nonpolar oil and a gelling or solidifying agent, pursuant to the invention have a core phase that contains a deodorizing and/or antiperspirant ingredient and differs from the shell phase in type and/or amount of these ingredients. The gel phase preferably contains 20-70 wt.% of a liquid silicone oil and 10-30 wt.% of a gelling or solidifying agent from the group consisting of saturated fatty alcohols, saturated triglycerides, waxy esters, or mixtures thereof. The core is preferably configured as a performance core and contains 15-40 wt.% of an antiperspirant astringent salt such as aluminum oxychloride, and the shell contains less than 18 wt.% of it.

This invention relates to a cosmetic preparation for controlling underarm perspiration and unpleasant body odors, in the form of a stick to deliver a composition that is dimensionally stable at room temperature and can be spread on the skin at body temperature, that contains two or more solidified phases with different compositions based on volatile silicone oils and gelling agents.

Two-phase stick preparations based on alcoholic soap gels have long been known, for example from DE-AS 11 22 221. Such preparations offer the capability of introducing individual components that are incompatible with other components into one phase of the stick, and in this way of preventing unwanted interactions with the components of the second phase. Introducing readily volatile or oxidation-susceptible components into the core of the stick can also increase the storage stability of the stick preparations. Finally, different ingredients can be introduced into the core and shell phases, or the ingredients can be introduced there in different concentrations to improve the technical properties of the stick in use. Thus, for example, a composition can be chosen for the core of the stick preparation that is unsuitable as a shell composition because of its sticky or soft consistency.

It has been found suitable in the present case for the core also to be configured as a "performance core" with a higher concentration of antiperspirant ingredient, and in this way improved rub-off properties can be achieved in use.

The object of the invention, therefore, is a stick preparation consisting of a composition that is dimensionally stable at 40°C, that can be spread on the skin and that melts at temperatures above 40°C, that consists of two or more separate solidified phases of different compositions arranged concentrically as core and shell, that contains a liquid oil and a gelling or solidifying agent, characterized by the fact that the core phase, which contains a deodorizing and/or antiperspirant ingredient, differs from the shell phase in the type and/or amount of this ingredient.

The stick preparation pursuant to the invention can also be configured to be esthetically very attractive by differing transparency, coloring, or pigmentation of the phases.

Solidified phases in the context of this invention are compositions that contain a liquid oil and a gelling or solidifying agent. The oil, for example, is a hydrocarbon, a silicone oil, a liquid ester, a di-n-alkyl ether, a branched fatty alcohol, or a mixture of these oils. Preferred oils in the context of the invention are especially silicone oils that may be linear and volatile or nonvolatile, or cyclic and low-boiling. Of particular advantage for use in deodorant sticks are the low-boiling and volatile silicone oils, since they leave no greasy residues on the skin. However, low-boiling linear polydimethylsiloxanes with 3-10 $Si(CH_3)_2O$ units are also suitable. A preferred cyclic silicone, for example, is cyclopentadimethylsiloxane.

In an especially preferred embodiment, the stick preparations pursuant to the invention contain in the solidified phase 20-70 wt.% of liquid silicone oil and 10-30 wt.% of a gelling or solidifying agent from the group consisting of saturated fatty alcohols, saturated triglycerides, waxy esters, or a mixture thereof.

Other substances can also be used as gelling agents, for example dibenzylidenesorbitol, N-acylated fatty acid amides, and N-acylated amino acid amides. Certain oil-soluble polymers such as polyacrylamides, fatty acid soaps (e.g. magnesium stearate or aluminum stearate) or 12-hydroxystearic acid and its esters or salts are also suitable gel-formers. Suitable fatty alcohols that are preferred are the linear saturated fatty alcohols with 14-40 carbon atoms, particularly cetyl and stearyl alcohols. Examples of suitable fatty acid glycerides are hardened palm fat, hardened bovine tallow, hardened castor oil, trilaurin, or tristearin. Suitable waxy esters, for example, are cetyl palmitate, stearyl stearate, or lauryl behenate.

In addition to the gelling or solidifying agents mentioned, the gel phase can also contain smaller amounts of liquid oily components, for example liquid fatty acid esters, addition products of 1-30 moles of propylene oxide and fatty alcohols with 4-18 carbon atoms, paraffin oils, or branched fatty alcohols, dialkyl ethers, e.g. di-n-octyl ether or lauryl methyl ether.

Finally, the gel phase can contain, in addition to the mentioned components, 1-10 wt.% of a nonionic surfactant that facilitates washing the products off the skin. Preferred for this are ethylene oxide addition products solid at 20°C, for example addition products with fatty alcohols, fatty acid partial glycerides, sorbitan fatty acid esters, or other lipid molecules that have a free

hydroxyl or carboxyl group that can react with ethylene oxide. Preferred suitable nonionic surfactants, for example, are the addition product of 10 to 30 moles of ethylene oxide with a cetyl/stearyl alcohol mixture, e.g. the commercial products Eumulgin® B1, B2, and B3 (Henkel KGaA). Other surface-active substances that are suitable pursuant to the invention, for example, are the addition products of 1-30 moles of ethylene oxide with methylglucoside fatty acid esters and alkyl(oligo)glucosides, and addition products of 1-30 moles of ethylene oxide with these.

The gel phases can also contain fragrances and optionally ingredients with cosmetic or dermatological action.

Individual fragrance compounds can be used as fragrances or perfume oils, for example the synthetic products of the type of esters, ethers, aldehydes, ketones, alcohols, and hydrocarbons. Examples of fragrance compounds of the ester type are benzyl acetate, phenoxyethyl isobutyrate, p-t-butylcyclohexyl acetate, linalyl acetate, dimethylbenzylcarbinyl acetate, phenylethyl acetate, linalyl benzoate, benzyl formate, ethylmethylphenyl glycinate, allylcyclohexyl propionate, styrallyl propionate, and benzyl salicylate. Examples among the ethers are benzyl ethyl ether, and examples of aldehydes are linear alkanals with 8 to 18 carbon atoms, citral, citronellal, citronellyloxyacetaldehyde, cyclamen aldehyde, hydroxycitronellal, lilial, and bourgeonal; examples of ketones are the ionones, α-isomethylionones, and methyl cedryl ketone; the alcohols include anethole, citronellol, eugenol, geraniol, linalool, phenylethyl alcohol, and terpineol; the hydrocarbons include primarily terpenes and balsams. However, it is preferred to use mixtures of various fragrances that jointly produce an appropriate fragrance.

Such perfume oils can also contain natural fragrance mixtures, such as those known from plant or animal sources, for example pine, citrus, jasmine, lily, rose, or ylang-ylang oils. Essential oils with low volatility that are usually used as aroma components are suitable as perfume oils, for example oil of sage, camomile oil, oil of cloves, balm mint oil, oil of mint, cinnamon leaf oil, linden flower oil, oil of juniper berry, vetiveria oil, oil of frankincense, galbanum oil, and ladanum oil.

Of particular importance for a deodorant/antiperspirant is the content of deodorizing and/or antiperspirant ingredients. Especially suitable deodorizing ingredients are antimicrobial

ingredients that inhibit microorganisms that decompose perspiration and enzyme inhibitors that block perspiration-decomposing esterase and lipase enzymes. Examples of suitable antimicrobial substances are 2,4,4'-trichloro-2'-hydroxydiphenyl ether (Triclosan®), chlorohexidene gluconate, phenoxyethanol, 1,5-pentanediol, 1,6-hexanediol, antimicrobial essential oils, or farnesol. Examples of suitable esterase-inhibiting substances are triethyl citrate or triacetin.

Used especially as perspiration inhibitors are astringent or protein-coagulating salts such as the aluminum, zinc, and zirconium salts that hydrolyze severely in aqueous medium. Examples of such salts with antihidrotic activity are aluminum chloride, aluminum oxychloride, aluminum dioxychloride, aluminum sesquioxychloride and their complex compounds with 1,2-propylene glycol, aluminum hydroxy allantoinate, aluminum chloride tartrate, sodium aluminum oxychloride lactate, aluminum zirconium trioxychloride, aluminum zirconium tetroxychloride, aluminum zirconium pentoxychloride, and their complex compounds with amino acids such as glycine.

An important feature of this invention then consists of the fact that the deodorant or antihidrotic ingredients are included in the phase that is positioned as the core of the stick in a way that differs in type and amount from the shell phase. It is preferred for the core phase to contain 15-40 wt.% of an antiperspirant astringent salt, and for the shell phase to contain less than 18 wt.% of it, with the concentration in the core phase being at least 30% higher based on the concentration in the outer or shell phase. The shell phase, for example, can also be completely devoid of antiperspirant salts and may possibly contain an antimicrobial deodorant ingredient.

The shell phase can also optionally have a higher fragrance content than the core phase.

Finally, the stick preparation pursuant to the invention may also contain other auxiliaries and additives to improve its consistency, shelf life, properties in use, and compatibility. Examples of such auxiliaries are antioxidants, complexing agents, inert fillers such as laminar silicates, talc, silica, finely divided polymer powders, or cosmetic ingredients such as vitamins, allantoin, anti-inflammatory agents, or skin softeners. It is preferred for the content of powdered inorganic and organic fillers to be in an amount of 0.1 to 10 wt.%.

In a preferred embodiment, the stick preparation pursuant to the invention is in the form of two (or more) concentrically arranged gel phases, the inner of which, the core phase, contains a deodorizing or antiperspirant ingredient, that differs from the shell phase in the type and amount of this ingredient. The core in principle does not have to be cylindrical in shape, but should nevertheless be in columnar form and can have any desired cross section. For production reasons, it may be preferable for the phases to be arranged parallel to the longitudinal axis of the stick.

In a preferred embodiment the shell phase contains a dye or a pigment that differs from the corresponding components in the core phase. The outer phase (shell phase) is preferably colored and more strongly perfumed than the core. Stick preparations that have particularly striking esthetic appeal can be obtained in this way. Especially suitable for this purpose are dyes that are insoluble in the liquid oil and do not bleed across the phase boundary.

Most suitable, therefore, are organic and inorganic pigment dyes, for example FD&C Red No. 40, Al Lake (C.I. 16035: 1), D&C Red No. 30 (C.I. 73360), D&C Red No. 7 (C.I. 15850: 1), C.I. Pigment Red 49: 1 (C.I. 15630: 2), C.I. Pigment Red 5 (C.I. 12490), D&C Yellow No. 10 Al Lake (C.I. 47005: 1), C.I. Pigment Green 17 (C.I. 77288), C.I. Pigment Blue 29 (C.I. 77007), FD&C Blue No. 1 Al Lake (C.I. 42090: 2), C.I. Pigment Blue 15 (C.I. 74160), C.I. Pigment Blue 27 (C.I. 77510), Ferric Oxide Yellow (C.I. 77492), Ferric Oxide Red (C.I. 77491), Ferric Oxide Black (C.I. 77499), and Titanium White (C.I. 77891).

The core and shell in principle can be in any ratio by weight to one another, from about 1:5 to 5:1. It is preferred, however, for the core phase to represent a 20-40 wt.% share of the total weight of the stick.

The stick preparation pursuant to the invention can be produced, for example, by first preparing the core by pouring the hot liquid gel into a mold, allowing it to cool and gel, and removing it from the mold, and then preparing the shell by placing the core in a wider mold, pouring the hot liquefied gel phase for the shell into the interspace between the core and the mold wall, allowing it to cool and gel, and removing it from the mold.

A similar method consists of first preparing the shell portion by casting the liquefied gel phase for the shell in an annular mold with removable cylindrical core piece, allowing it to cool and gel, and removing the core piece, and then casting the liquid gel composition of the core in the cylindrical cavity of the shell prepared in this way, and allowing it to solidify.

In this case in principle the continuous process for manufacturing multicolored soap strands from soap compositions of different colors known from soap production technology can be used, by preparing a strand of two or more different gel compositions that can be cut into sticks of any desired length. Such processes for the production of strands of concentrically arranged phases are the coaxial strand extrusion process disclosed, for example, by AT-PS 198 501 or DE-AS 25 26 917. Other methods for producing multiphase strands of phases arranged parallel to the longitudinal axis (but not concentric) are described in US 3,268,970.

The multiphase stick preparations produced in this way are preferably introduced into a sleeve with a bottom piston movable along the sleeve axis by pushing, turning, or pressing mechanics, like those customary for deodorant sticks and other cosmetic sticks. This makes it possible to use the stick without direct contact of the fingers with the stick compositions.

The following examples are intended to describe the invention in further detail:

Examples

Antiperspirant stick compositions are made following the recipes in the table.

Composition	K1	K2	H1/K3	H2
Cyclomethicone d 5	40.3	40.3	54.68	54.97
Witconol® APM	--	11.0	--	11.0
Emulgin® B1	5.0	--	5.0	--
Cutina® HR	2.0	5.0	2.0	5.0
Cetyl alcohol	5.0	--	5.0	--
Stearyl alcohol	12.0	20.0	12.0	20.0
Vitamin E acetate	0.4	0.4	--	--
Talc Pharma G	3.0	8.0	3.0	8.0
Aerosil® R 972	2.0	--	2.0	--
Al oxychloride powder	30.0	15.0	15.0	--
Perfume oil	0.3	0.3	1.3	1.0
Dye	--	--	0.02	0.03

1. Preparation of the gel phases

Cyclomethicone d5, Witconol® APM, Eumulgin® B1, Cutina® HR, the fatty alcohols, and Aerosil® R 972 were blended together with stirring at 70°C. After cooling to 65°C, the Al oxychloride powder, talc, and Vitamin E acetate as well as the dye were added. After cooling to 60°C the perfume oil was stirred in.

2. Production of the stick preparation

A stick composition according to K1 removed from the mold was inserted centered in a conventional stick sleeve. The stick composition H1 was then prepared and cast at 60°C in the interspace between core and sleeve wall.

After screwing down the caps, the stick sleeves were inverted, i.e. set on their heads, so that the stick composition still not solidified formed a smooth surface in the cap. After cooling to 20°C an attractive-appearing 2-phase stick was obtained with a blue-colored outer phase and a white core.

2-Phase sticks were prepared in the same way from the stick compositions

K1 (core) + H2 (shell)
K1 (core) + H1 (shell)
K2 (core) + H2 (shell)
K3 (core) + H2 (shell)

2-Phase sticks with blue-colored shell phase and white or lighter core phase were obtained in each case; they showed no change when stored for 1 week at 40°C.

Patent Claims

1. Stick preparations consisting of a composition with dimensional stability at 40°C that can be spread on the skin and melts above 40°C, that consists of at least two separate solidified phases of different compositions and arranged as core and shell, that contain a liquid oil and a gelling or solidifying agent, characterized by the fact that the core phase, which contains a deodorizing and/or antiperspirant ingredient, differs from the shell phase in the type and/or amount of this ingredient.

2. Stick preparations pursuant to Claim 1, characterized by the fact that the solidified phases contain 20-70 wt.% of a liquid silicone oil and 10-30 wt.% of a gelling or solidifying agent from the group consisting of saturated fatty alcohols, saturated triglycerides, waxy esters, or a mixture thereof.

3. Stick preparations pursuant to one of the claims 1 or 2, characterized by the fact that the core phase contains 15-40 wt.% of an antiperspirant astringent salt and the shell phase contains less than 18 wt.% of it, with the concentration in the core phase being at least 30% higher based on the concentration in the shell phase.

4. Stick preparations pursuant to one of the claims 1-3, characterized by the fact that the solidified phases additionally contain 1-10 wt.% of a nonionic surfactant, preferably an ethylene oxide adduct that is solid at 20°C.

5. Stick preparations pursuant to one of the claims 1-4, characterized by the fact that the shell phase contains a dye or a pigment that differs from the core phase in type and/or amount.

6. Stick preparations pursuant to one of the claims 1-5, characterized by the fact that the solidified phases contain powdered inorganic fillers in an amount of 0.1-10 wt.%.

7. Stick preparations pursuant to one of the claims 1-6, characterized by the fact that the core phase represents a 20-40 wt.% share of the total weight of the stick and the shell phase contains a pigment dye insoluble in the liquid oil.